

I. Evaluate. Round to the nearest hundredth.

1) $\ln(4.7)$	2) $8.9e^{3.6}$
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II. Write the equivalent logarithmic equation

3) $e^{-2.865} \approx 0.06$	4) $e^{-5x} = 6.78$
5) $e^{\frac{6}{x}} = 4.5$	6) $e^{7x-3} = 22$

III. Write the equivalent exponential equation

7) $\ln(7.3) \approx 1.99$	8) $\ln(86.4) = x$
9) $\ln\left(\frac{3}{x}\right) = 23.45$	10) $\ln(x) = 3.5$

IV. Simplify each expression.

11) $7.1 \ln e^3$	12) $e^{6 \ln 2}$
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V. Use the Natural Logarithmic Properties to expand or express as a single natural logarithm.

13) <b>Expand.</b> $\ln \left( \frac{z^7 y}{x^{\frac{1}{2}}} \right)$	14) <b>Condense.</b> $2 \ln(4p) - 5.28 \ln(q) + \ln(r)$
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VI. Solve for x. **Round to the nearest hundredth.**

15) $4(6)^x - 8 = 48$	16) $e^{2x+5} = 7$
17) $4^{\frac{3}{x}} = 11$	18) $9.3^x = 37$

VII. Solve for x. Round to the nearest hundredth.

19)  $9.5e^{2.7x+9} = 28.5$

20)  $4e^{-x-3} - 2 = 10$

VIII. Use Logarithmic Properties to solve the following equation for x.

21)  $\log_5 (x - 4)^8 = \log_5 7^8$

22)  $\log_3 (x - 8) = \log_3 2 + \log_3 8$

23)  $\ln(6x) - \ln(5x + 3) = 0$

24)  $2 \ln x + \ln 2 = \ln 2 + \ln(5x - 6)$

IX. Find the amount  $A$  using the continuously compounded interest. **Round to the nearest hundredth.**

25) What is the formula for continuously compounded interest? \_\_\_\_\_

26) \$1,250 at 5.6% for 5 years	27) \$2,300 at 3.8% for 2 years
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X. Find the time  $t$  using the continuously compounding interest. **Round to the nearest hundredth.**

28) How long will it take to double your money if you deposit \$28,000 at an annual rate of 4.3% compounded continuously?
29) How long will it take to triple your money if you deposit \$730 at an annual rate of 2.9% compounded continuously?

XI. **Round to the nearest hundredth.**

30) The amount of radioactive carbon-14 remaining after $t$ years is given by the formula $N(t) = N_0 e^{-0.0045t}$ . How much of a 32 milligram sample will remain after 75 years?
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